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Statement on Advances in Geological Carbon Sequestration

Robert J. Finley
Director, Energy and Earth Resources Center
Illinois State Geological Survey
finley@isgs.illinois.edu

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Mr. Chairman, members of the Committee, I appreciate the opportunity to appear before you today to offer comments on carbon sequestration. Understanding the capacity to geologically sequester carbon dioxide (CO_2) produced as a byproduct of fossil fuel use, including the use of advanced coal technologies, is an essential strategy to mitigate climate change related to the buildup of greenhouse gases in the atmosphere. In 2007, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) stated that "carbon capture and storage in underground geological formations is a new technology with the potential to make an important contribution to mitigation by 2030. Technical, economic and regulatory developments will affect the actual contribution." At the Illinois State Geological Survey, a unit of the University of Illinois, we have been investigating sequestration technology since 2003 as part of a U.S. Department of Energy (DOE) Regional Carbon Sequestration Partnership. Our Partnership, the Midwest Geological Sequestration Consortium (MGSC), covers the Illinois Basin, a 60,000 sq. mi, geological feature that extends beneath most of Illinois, southwestern Indiana, and western Kentucky. Our Phase I Characterization effort, 2003-2005 focused on compiling existing information that, when evaluated, indicated the Illinois Basin has suitable geology for geological carbon sequestration. Our Phase II Validation effort, involving multiple small-scale, field pilot injection projects, began in late 2005 and will continue to be carried out through 2009. Most importantly, we are now engaged in a critical Phase III Deployment effort, the Illinois

Basin-Decatur test site, that will offer significant advances in geological carbon sequestration technology.

After two years of site-specific planning and development at a site in Decatur, Illinois we began, on February 14, 2009, the drilling of a 7,500 feet deep injection well that will receive 1,000 metric tons per day of CO_2, beginning about this time next year. This is the first Phase III deployment well in the nation drilled as part of the DOE regional sequestration partnership program and the first well permitted for 1 million metric tons under existing Class I U.S. EPA Underground Injection Control regulations. We will be injecting over three years to meet our 1 million metric ton objective. The permit is held by the Archer Daniels Midland Company, who has provided a half-square mile site, logistical and engineering support, and will provide the CO_2 from their fuel ethanol production operation. We are confident that our work over the preceding five years and a year-long permitting process has resulted in an exceptional site for Deployment phase testing. We have evaluated subsurface rock formations to define a reservoir to hold the CO_2, defined multiple thick and competent reservoir seals, and demonstrated that there are no detectable faults and fractures that could become leakage pathways. We believe we will be able to show that the sequestration process can be safe and effective.

As a climate change mitigation strategy, the CO_2 must remain in place and not leak back to the atmosphere, not contaminate potable ground water, not affect surface biota, and not present a risk to human health and safety. That implies that we must do an excellent job of investigating the properties of these rocks and the fluids now within them and of predicting their performance in the future. At our Illinois Basin-Decatur site, we have been carrying out environmental monitoring since mid-2008. Before CO_2 is ever injected, we will have more than a year of background data on groundwater chemistry, soil gas composition, plant stress assessed through color infrared imagery, and atmospheric monitoring. We have 12 groundwater wells over the projected area of the subsurface CO_2 plume and beyond. We will conduct more geophysical studies that will show us in three dimensions where within the reservoir rock the CO_2 is actually located. Most importantly, we will drill two additional 7,500 feet deep observation wells within the half-square mile area of the plume to calibrate the geophysical studies and ensure that our understanding of the fate of the CO_2 is as complete as possible. These same wells will also serve as early

warnings of any failure of our primary reservoir seal, an outcome with very low probability, but one that we nevertheless must demonstrate is not taking place. We have a comprehensive risk assessment process in place that defines our response to equipment failures, accidents, and geological problems.

Let me conclude with some observations on the process to date. We sometimes read comments that geological carbon sequestration is an untested technology and therefore cannot be part of the global climate change response. I would suggest the opposite: that well characterized sites with appropriate geology and careful monitoring can make a contribution, and, in fact, must be part of a portfolio response to dealing with carbon dioxide emissions. In our regional partnership, the MGSC, we are addressing every element of a comprehensive research agenda that we believe will show that geological carbon sequestration can be scaled up to be a safe and effective tool to combat climate change. Further, we are working to ensure that we share our results with research consortia around the world. A State Department-World Resources Institute delegation of university researchers and corporate officials from China visited the Illinois Basin-Decatur site two weeks ago; we will make a reciprocal visit to China in June. Next week, I will present our partnership results at a meeting of the CO_2Geonet European (research) Network in Italy. While there is more yet to do in understanding the contributions that geological carbon sequestration can make at larger scales in combating climate change, and more of these efforts will take place as a result of the provisions of the Recovery and Reinvestment Act, I believe we are now moving at an accelerating pace to develop this technology and to share it around the world for our common benefit. Thank you for the opportunity to be here this morning.

Robert J. Finley
Biographical Summary

Robert J. Finley is the Director of the Energy and Earth Resources Center at the Illinois State Geological Survey, Champaign, Illinois. He joined the Illinois Survey in February 2000 after serving as Associate Director at the Bureau of Economic Geology, The University of Texas at Austin. Rob's area of specialization is fossil energy resources and geological carbon sequestration. His work has ranged from large-scale resource assessment, addressing hydrocarbon resources at national and state scales, to evaluation of specific fields and reservoirs for coal, oil, natural gas, and carbon dioxide storage. He is currently heading the Midwest Geological Sequestration Consortium, a U.S. Department of Energy regional carbon sequestration partnership in the Illinois Basin aimed at addressing approaches to geological carbon management. Rob has served on committees of the National Petroleum Council, the American Association of Petroleum Geologists, the National Research Council, the Stanford Energy Modeling Forum, and the U.S. Potential Gas Committee. He has taught aspects of energy resource development since 1986 to numerous clients domestically and overseas in Venezuela, Brazil, South Africa, and Australia, among other countries. Rob holds a Ph.D. in geology from the University of South Carolina. He is currently also an Adjunct Professor in the Department of Geology, University of Illinois at Urbana-Champaign.